

We Claim:

1. A method of detection of a run-flat condition of a vehicle tire, said tire being mounted on a wheel, wherein:

- a quantity  $f(\alpha, t)$  is sensed, which varies with the angular displacement of the wheel in time;
- measuring signals are developed from that quantity, which vary with the angular speed of the wheel  $d\alpha(t)/dt$ ;
- a quantity characteristic of the dispersion of measuring signals is calculated;
- an alarm is set off when the characteristic quantity satisfies a given ratio.

2. A method of detection according to Claim 1, in which said characteristic quantity is the value of the standard deviation of said measuring signals.

3. A method of detection according to Claim 1, in which, in order to calculate the characteristic quantity of dispersion of the measuring signals:

- the rotation frequency of the wheel is determined;
- the energy of the measuring signals is calculated in at least one narrow frequency band centered on one of the first harmonics of said rotation frequency; and
- an alarm is set off when said energy satisfies a given ratio.

4. A method of detection according to Claim 3, in which the rotation frequency of the

wheel is determined from said measuring signals.

5. A method of detection according to Claim 3, in which the energy of said measuring signals is calculated in at least two narrow frequency bands, each centered on one of the first harmonics of the rotation frequency of said wheel, with the exception of the first harmonic.

6. A method of detection according to Claim 3, in which, after having detected that the sum of the energies of the measuring signals in at least two narrow frequency bands centered on one of the first harmonics satisfies a given ratio, the energy of the measuring signals is compared in each of said frequency bands to a given corresponding threshold and an alarm is set off when, for at least two of said frequency bands, the energy of the signals is higher than said corresponding threshold.

7. A method according to Claim 3, including comparing the energy or energies of the measuring signals of the wheel of said tire with the energy or energies of the measuring signals of at least one of the other tires of the vehicle and an alarm is set off when the result of the comparison satisfies a given ratio.

8. A method of detection according to Claim 3, in which measuring signals are developed which vary with the angular acceleration of the wheel  $d^2\alpha(t)/dt^2$ .

1 9. A method of detection according to Claim 3, in which said narrow frequency band or  
2 bands has a width less than or equal to 10 hertz.

1 10. A method of detection according to Claim 3, in which the energy of said measuring  
2 signals is further calculated in at least a second frequency band, where the measuring signals are  
3 substantially independent of the run-flat condition of said tire and no alarm is set off when the  
4 measuring energy in said second frequency bands exceeds a given threshold.

1 11. A method of detection according to Claim 10, in which said second frequency bands  
2 are situated outside the multiple frequencies of the rotation frequency of said wheel.

1 12. A method of detection according to Claim 1, in which no alarm is set off when the  
2 speed of said vehicle is below a given threshold.

1 13. A method of detection according to Claim 1, in which the location of the tire in run-  
2 flat condition is identified and transmitted to the driver of the vehicle.

1 14. A method of detection according to Claim 1, in which, a vehicle containing a wheel  
2 antilock device, the measuring signals are developed from sensors of said wheel antilock device.

1           15.    A system of detection of a run-flat condition of a vehicle tire, said tire being mounted  
2 on a wheel, comprising:

- 3    - first means for sensing a quantity  $f(\alpha, t)$  which varies with the angular displacement of the wheel  
4      in time,
- 5    - second means for elaborating measuring signals from that quantity, which vary with the angular  
6      speed of the wheel  $d\alpha(t)/dt$ , calculating a characteristic quantity of dispersion of the measuring  
7      signals and setting off an alarm when said characteristic quantity satisfies a given ratio;
- 8    - third means for transmitting said alarm to the driver of the vehicle; and
- 9    - fourth means arranged in the mounted tire/wheel assembly to generate vibrating warning signals  
10     on a run-flat condition of the tire.

1           16.    A system according to Claim 15, in which said means for generating vibrating  
2 warning signals generate at least one sinusoidal function, the period of which is a submultiple of a  
3 turn of the wheel.

1           17.    A system according to Claim 16, in which said means for generating vibrating  
2 warning signals appreciably generate only one sinusoidal function, the period of which is a  
3 submultiple of a turn of the wheel.

1           18.    A system according to Claim 15, in which, a vehicle being equipped with a wheel

2 antilock device, the first and second means consist of the sensors and computer of said wheel  
3 antilock device.

1 19. A safety insert intended to be radially mounted outside the rim of a wheel, said safety  
2 insert containing on its radially outer surface axially oriented bars, characterized in that said bars  
3 have sides whose inclination from normal to the tread in the longitudinal direction varies as a  
4 function of azimuth.

1 20. A safety insert according to Claim 19, in which the longitudinal inclination of the bars  
2 as a function of azimuth is at least a sinusoidal function whose period is a submultiple of the turn  
3 of the insert.

1 21. A tire intended to equip a wheel, said tire containing a tread, two sidewalls and two  
2 beads as well as support elements intended to support the tread in case of run-flat condition,  
3 characterized in that said support elements contain means for generating rotation speed variations  
4 on a run-flat condition of said tire.

1 22. A tire according to Claim 21, in which said means for generating rotation speed  
2 variations of said wheel entail a variation as a function of azimuth of the radius under load of said  
3 tire on running with a tire deflection above a given threshold.

4           23.     A tire according to Claim 22, in which the variation as a function of azimuth of the  
5 radius under load of said tire is at least a sinusoidal function, the period of which is a submultiple  
6 of a turn of the insert.

1           24.     A wheel intended to receive a tire, characterized in that it contains means for  
2 generating rotation speed variations of said wheel on a run-flat condition of said tire.

1           25.     A wheel according to Claim 24, in which said wheel presents a variation as a  
2 function of azimuth of the radial height of at least one of its flanges.

1           26.     A wheel according to Claim 25, in which said variation of radial height of at least  
2 one of the flanges as a function of azimuth is obtained by the addition of an extra part at least  
3 partially covering the radial end of said flange.

1           27.     A wheel according to Claim 25, in which said variation of radial height of at least  
2 one of the flanges as a function of azimuth is at least a sinusoidal function, the period of which is  
3 a submultiple of a turn of the insert.